



Evidence to Recommendations Framework for the use of Tdap for decennial Td booster, tetanus wound prophylaxis and the catch-up immunization schedule

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Advisory Committee on Immunization Practices

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Evidence to Recommendations (EtR) Framework

- Decennial Td booster and tetanus prophylaxis in wound management
 - Benefits and harms
 - Focus on programmatic issues
 - Values, preferences, acceptability and feasibility
 - Resource use
 - Work group interpretation
- Catch-up immunization schedule

Benefits and Harms

Are there programmatic benefits to allowing either Td or Tdap to be used?

- Provider ease and flexibility
 - Challenging to determine patient history and receipt of previous Tdap
 - Cumbersome to stock both Td and Tdap vaccines

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Work group interpretation: There are benefits to giving providers flexibility to use either Td or Tdap

Are there benefits to repeat Tdap vaccination on pertussis prevention and control?

- Evidence that 2nd dose of Tdap is immunogenic
- Immunogenicity data on >2 doses of Tdap are lacking
- Uncertain duration of protection
 - Evidence of short duration of protection in persons given acellular pertussis vaccines for their childhood series
 - Lack of data on duration of protection among those primed with whole cell pertussis vaccines in childhood
- Uncertain role in the prevention of transmission and herd immunity

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Work group interpretation: Insufficient evidence of benefit in pertussis control to recommend that Tdap replace Td for all decennial boosters

Are there benefits to repeat Tdap for healthcare personnel?

- Reviewed by previous ACIP work group
- Pertussis transmission occurs in healthcare settings
- Insufficient data that healthcare personnel at increased risk for pertussis infection
- Lack of strong evidence that additional Tdap doses for healthcare personnel would be beneficial for pertussis control in healthcare settings

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Work group interpretation: Insufficient evidence to have recommendations for healthcare personnel that are different than those for the general population

Are there potential harms?

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- Safety data of 2nd Tdap vaccination reviewed by previous Work Group with recent data presented at October 2018 ACIP meeting

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Work group interpretation: No substantive safety concerns

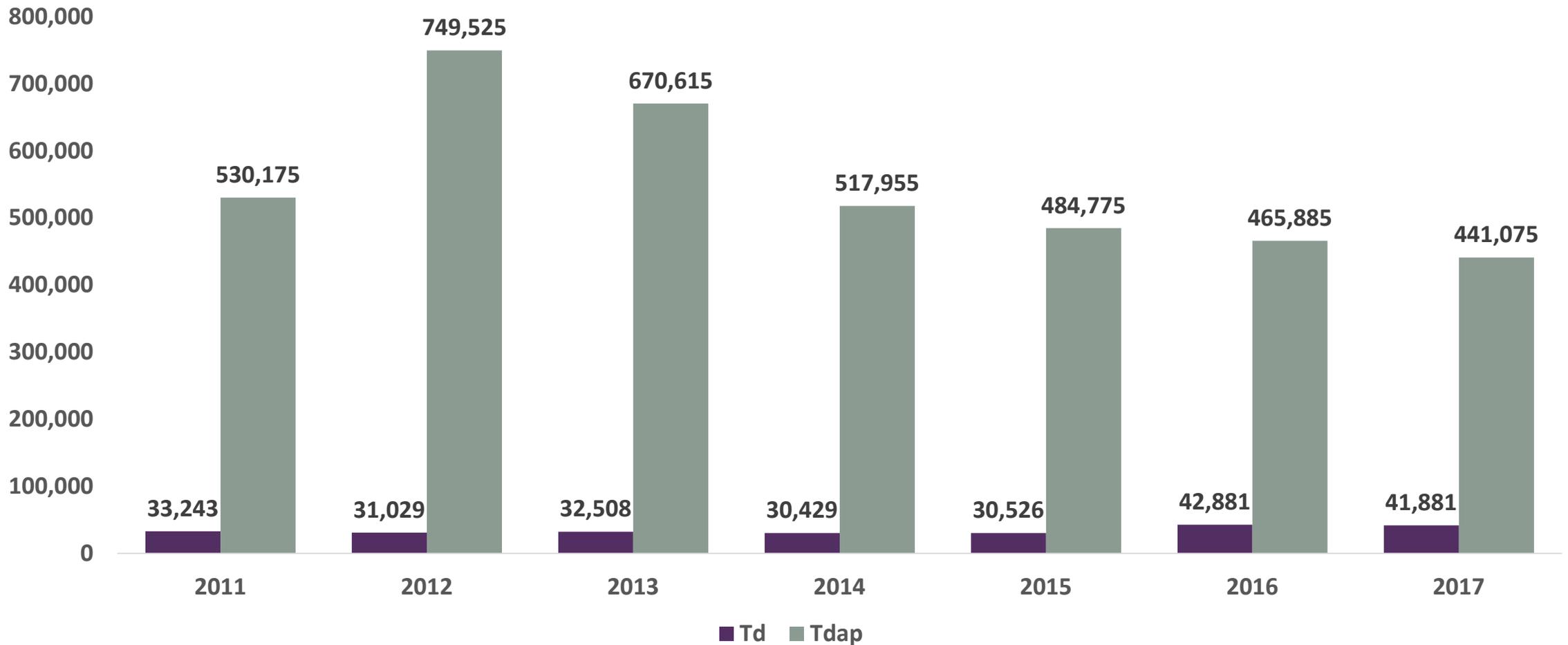
Work group interpretation: Benefits outweigh harms

Values, Preferences, Acceptability and Feasibility

Do patients and providers value or have a preference for repeat Tdap vaccination?

- No studies about values and acceptability for stakeholders
 - Target population: general adult population
 - Providers
 - Immunization programs
- The proposed recommendation doesn't require any additional vaccine doses
- Evidence indicating that repeat vaccination with Tdap is already a widespread practice

Provider dose ordering (public sector purchases): Adult Td and Tdap Doses, 2011-2017



Tdap given more frequently than Td

- Vaccine Safety Datalink¹: 68,915 persons received Tdap and who received another Td-containing vaccine
 - **Tdap: 89%**
 - **Td: 11%**

¹Jackson ML, et al. Safety of repeated doses of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine in adults and adolescents. *Pharmacoepidemiol Drug Saf* 2018 Aug;27(8):921-925.

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Commercial Insurance Claims: Persons aged 19 to 64 years, 2017²

Tdap	716,638
Td	61,468

**Tdap > Td claims:
11.7x**

¹Jackson ML, et al. Safety of repeated doses of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine in adults and adolescents. *Pharmacoepidemiol Drug Saf* 2018 Aug;27(8):921-925. ² Truven MarketScan databases, Outpatient Services Table, 2017.

Is repeat Tdap vaccination acceptable and feasible?

- Evidence that the practice of giving Tdap in place of Td is already widespread despite:
 - Not currently recommended by ACIP
 - Off-label use of Tdap vaccines in clinical practice

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Work group interpretation: Allowing either Tdap or Td to be used would be acceptable and feasible for stakeholders, and may be preferred by providers

Resource Use

Tdap is more expensive than Td

CDC Vaccine price list ¹	CDC cost per dose ²	Incremental cost of Tdap over Td
Td (TDVAX™) ³	\$13.96	
Tdap (Boostrix®) ⁴	\$24.65	\$10.68
Tdap (Adacel®) ⁴	\$24.49	\$10.53
Commercial claims ⁵	Median cost	
Td (n=61,468)	\$27.38	
Tdap (n=716,638)	\$44.07	\$22.56

1. Source: <https://www.cdc.gov/vaccines/programs/vfc/awardees/vaccine-management/price-list/index.html>, updated April 1, 2019

2. Indicates cost for 10 pack – 1 dose vial. 3. Vaccine cost includes \$1.50 per dose Federal Excise Tax 4. Vaccine cost includes \$2.25 per dose Federal Excise Tax 5. Source: Truven MarketScan databases, Outpatient Services Table, DY 2016

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Is allowing either Tdap or Td to be used a reasonable and efficient allocation of resources?

- Work Group reviewed economic impact analyses, including internal CDC analysis
- Uncertainty on key parameters
 - All economic analyses sensitive to pertussis incidence estimates
 - Lack of reliable estimates of disease burden, particularly in adults
- Not accounted for:
 - Cost savings resulting from only carrying one vaccine
 - Repeat Tdap doses already given

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Work group interpretation: Economic impact analyses did not drive the decision-making process for these programmatic questions

Should any Td-containing vaccine (Tdap or Td) be allowed for use for the decennial Td booster and tetanus prophylaxis in the setting of wound management?

Criteria	Work Group Interpretation
Benefits and Harms	<ul style="list-style-type: none">• Increased flexibility for providers• May be some additional benefit for pertussis control<ul style="list-style-type: none">• Not enough evidence to recommend Tdap preferentially replace Td• No substantive safety concerns <p>Benefits outweighs potential harms</p>
Values, Acceptability and Feasibility	<ul style="list-style-type: none">• Providers value flexibility• Evidence of widespread use of Tdap instead of Td <p>Valued by stakeholders; change is acceptable and feasible</p>
Resource Use	<ul style="list-style-type: none">• Tdap more expensive than Td• Economic analyses limited by uncertainty in key parameters <p>Economic impact not a major consideration</p>

Should any Td-containing vaccine (Tdap or Td) be allowed for additional catch-up doses for those with incomplete or unknown vaccine history?

Policy Options: Adolescent and adult series for those with incomplete or unknown vaccine history

1) No change



* Single dose of Tdap is preferred, followed by a dose of Td at least 4 weeks after Tdap and another dose of Td 6 to 12 months later. However, the single dose of Tdap can substitute for any of the Td doses in the 3-dose primary series.

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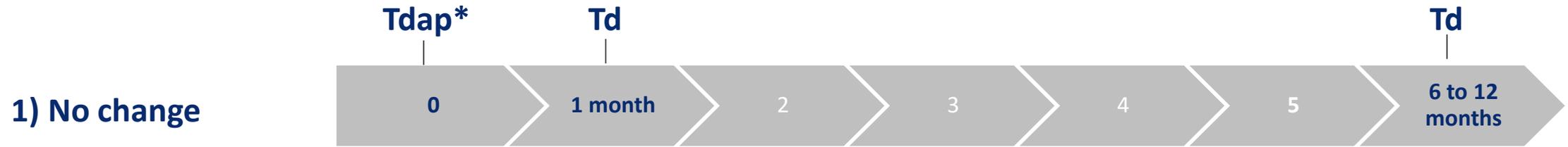
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Should any Td-containing vaccine be allowed for additional catch-up doses in persons ≥ 7 years with incomplete or unknown vaccine history?

Criteria	Work Group Interpretation
Benefits and Harms	<ul style="list-style-type: none"> • Increased flexibility for providers • May be some additional benefit for pertussis protection in previously unimmunized persons <ul style="list-style-type: none"> • Not enough evidence to recommend Tdap preferentially replace Td • No substantive safety concerns <p>Benefits outweighs potential harms</p>
Values, Acceptability and Feasibility	<ul style="list-style-type: none"> • Providers value flexibility • Gives providers more options if Td availability decreases <p>Valued by stakeholders; change is acceptable and feasible</p>
Resource Use	<p>Economic impact not a major consideration for this policy question</p>

Catch-up immunization in pregnant women

- Current catch-up schedule same for pregnant women and general population
- Previously unimmunized women may require two doses of a tetanus toxoid-containing vaccine to prevent obstetric and neonatal tetanus
- Data are lacking on safety of multiple doses of Tdap during a single pregnancy
 - Registry data: Patients who received >1 dose during a single pregnancy
 - No concerning safety signal for this or for women who receive closely-spaced Tdap vaccinations in different pregnancies

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 - Registry data: Patients who received >1 dose during a single pregnancy
 - No concerning safety signal for this or for women who receive closely-spaced Tdap vaccinations in different pregnancies

Work group interpretation: Recommendations for catch up immunization in pregnancy should continue to be similar to those for the general population

Potential off-label recommendations

Licensed Tdap product	Current FDA indications, usage and administration	Possible off-label recommendations		
		Decennial Td booster (adults only)	Tetanus prophylaxis for wound management	Catch-up immunization series ^{1,2}
Adacel (Sanofi Pasteur)	<ul style="list-style-type: none"> Age: 10 through 64 years Routine booster³ with a 2nd dose ≥8 years after first (any) Tdap dose Tetanus prophylaxis if ≥5 years since last tetanus containing vaccine⁴ 	<ul style="list-style-type: none"> Age ≥65 years Any dose beyond 2nd Adacel dose administered ≥8 years from first Tdap 	<ul style="list-style-type: none"> Age <10 or ≥65 years 	<ul style="list-style-type: none"> Age 7 to 9 years or ≥65 years >1 Tdap dose
Boostrix (GSK)	<ul style="list-style-type: none"> Age: ≥10 years Single dose³ Tetanus prophylaxis if no previous Tdap⁴ 	<ul style="list-style-type: none"> Any dose if previously received Tdap 	<ul style="list-style-type: none"> Age <10 years Any dose if previously received Tdap 	<ul style="list-style-type: none"> Age 7 to 9 years >1 Tdap dose

¹ Current catch-up immunization recommendations: persons with incomplete or unknown vaccine history should receive a single dose of Tdap as one dose (preferably the first) of the three-dose catch-up series. If additional doses are needed, Td is recommended. ² Note on pregnancy: Both Tdap vaccines may be administered during pregnancy with the same intervals and restrictions (vaccine specific) as would apply to a non-pregnant individual. ³ Five or more years after a dose of DTaP or Td vaccine. ⁴ Please see Td package insert for indications and intervals for wound management

Policy options for ACIP consideration

Policy question

Work Group Interpretation

Either Tdap or Td can be used for the decennial Td booster

We are in favor of the intervention

Either Tdap or Td can be used for tetanus prophylaxis in the setting of wound prophylaxis

We are in favor of the intervention

Either Tdap or Td can be used for additional doses of the catch-up immunization schedule for persons ≥ 7 years

We are in favor of the intervention

Questions?

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.